E x p l a n a t i o n   o f   Fig. 1   (in connection with the Laws of Thermodynamics)..

(1) First Law .

I would like to point out that this device works at the expense of the inner thermal energy of the ambient air,i.e. the first law is not violated.With my wording "without needing any external heat source",appearing on line 11 (from the bottom) of my statement under Art.19(1), I meant "external source introduced by humans".This is clear in my description (p.2,line 13). For more details I present herewith the mathematical analysis of the three-phase cycle of Fig.1, which is repeated here as Fig.1a (next p.3/3) with the appropriate symbols and arrows. It represents a three phase reverse (refrigeration) thermodynamic cycle. Let

Phase (1 - 2) = adabatic expansion, $l_{12} = c_v{}^*(T_0-T_c)$ [8,p.245] = work produced by the cycle. Phase (2 - 0) = isobaric expansion, $l_{20} = R^*(T_0-T_c)$ [8,p.233] = internal work done by the cycle ($R=c_p-c_v$) [8,p.49], $q_2 = (c_p{}^*(T_0-T_c)$ [8,p.235] =amount of heat added to the exchanger from an outside source (ambient air).

Phase (0 - 1) = isothermal compression, $l_{01} = q_1$ (for an ideal process)[8,p.237] = amount of work done on the cycle(l_{01}) and correspondingly amount of heat removed from it (q_1)

According to the first law of thermodynamics (conservation of anergy) [8,p.57], the work l_c done on a cycle is equal to the heat q_c removed from it. That is

$$l_c = q_c, \quad l_{01} - l_{12} - l_{20} = q_1 - q_2 \qquad (1)$$

This is the energy equation of a refrigeration cycle. In the case of the present invention, not only is $l_{01} = q_1$ but also $\underline{l_{01} = q_1 = 0}$,   so that

$$l_{12} + l_{20} = q_2 \quad \text{or}$$
$$c_v{}^*(T_0-T_c)+R^*(T_0-T_c)=c_p{}^*(T_0-T_c) \qquad (2)$$

This equation is the energy equation specifically for the cycles of Figs 1 and 1a. Due to the spontaneous isothermal aggregation in phase (0 – 1), ($l_{01} = q_1 = 0$), the cycle functions as a refrigerator, but at the same time with production of work vs the conventional one that needs work input (electrical current) from outside.   - / -

(2) The Second Law of Thermodynamics

In contrast with the first law,characterising the processes quantitavely,the Second Law [8,p.63],saying that "every actual spontaneous process is irreversible", characterises the qualitative side of these processes and is presented here as follows: Phase (0---1)(Fig.1) is realized within the microscopic slots,wherein presuure and temperature have no meaning as such whatsoever,the molecules rebound from the walls (without colliding with each other) with the same average velocity with which they fall upon ([1] of my references) and consequently the output temperature is equal to the input one,while the pressure increases,due to the sponaneous aggregation.When we confine ourselves to looking at the inside of the microscopic area,the second law does not apply, it simply has no effect within a nonthermodynamic area i.e. the slots. On the other hand a slot could be paralleled to "Maxwell's Demon",described as an imaginary microscopic inteligent being, capable of appropriately separating the individual molecules to produce temperature difference. Here,the slots do something similar, they produce pressure difference (without expense of any additional work).The possibility for me to use slots of size equal to $10\mu m$ (realizable only with MEMS technology [5,p.56] of my references), is due to the fact that the existence of the molecular layer happens to be in the range of the mean free path of the molecules (in a rarefied gas) equal to about $10\mu m$, while Maxwell apparently had conceived the aperture upon which his "demon" would act as having dimensions much smaller. Thus,an alternative phrase of the second law had been adopted by the scientists at that time "a perpetual motion machine of the second kind ia impossible".Now,when we consider the whole system of the slots, the circulating gas and the ambient air, the second law is indeed violated by the present invention.Moreover,Brown's patented apparatus (document attached herein) should work on the same grounds.as my invention.

As I mensioned in my statement under Art.19(1), my study has been based on the fundamental work carried out on the external friction of gases by W.Gaede (ref[1] of my description),who found (theoretically) a formula ((2), p.4 of the description),giving the number of molecules rebounded from any point of the inner surfaces to any other point of them and verified it (experimentally). ___ .